



Cross-cutting thematic of the Safe-by-Design NMBP-15 projects

The European Commission's Horizon 2020 call for projects NMBP-15 centers on **"Safe by design (SbD), from science to regulation: metrics and main sectors"**.
The four funded projects, running through 2024, offer coverage across these themes:

Regulatory and governance issues for Safe by Design in nanotech - from safety to sustainability

The **EU Chemicals Strategy for Sustainability** towards a toxic-free environment is a step towards the European Green Deal zero-emissions target for a pollution-free environment. The strategy promotes innovative solutions for safe and sustainable chemicals, minimizing environmental footprints, and increasing protection of people and the environment. **NMBP-15 projects directly contribute to the strategy** and ongoing international activities towards a more sustainable development, addressing also criteria beyond safety (e.g. environmental, circular, economic and social aspects).

NMBP-15 projects **facilitate implementation of SbD in the nanotech innovation chain**, and enable the safe(r) development and application of nano by **advancing scientific knowledge of the potential impact** on human health and the environment - then provide **tools for real-life relevant risk prediction & assessment** along the entire life cycle. These will support risk governance on both the regulatory and the industrial side.

The four projects will deliver proper surface engineering approaches, risk management measures' performance models, new data on functionality-material relationships and tools for rapid tox screening during online production.

Active dialogue with regulatory stakeholders and the NMBP-13 projects establishing a Nano Risk Governance Council will help to **facilitate acceptance** of newly developed SbD tools and predictive models for risk assessment.

ELSA and Responsible Research and Innovation are served by our projects

The NMBP-15 consortia have a direct experience of transdisciplinary work! We gather experts from release, fate, exposure, hazard, risk assessment, materials scientists and IT developers, as well as end-users from industry and regulation.

Obviously safer nanotech is not just a tech issue. Achieving sustainability means our solutions have to also address Ethical, Legal and Social Aspects (ELSA) and Responsible Research and Innovation (RRI). For that, the NMBP-15 teams include the social sciences and humanities.

While "Safe/r/ty by Design" are terms often heard, our projects reveal that they cover multiple and possibly contradictory meanings. Our aim is to help end-users get a handle on these dimensions and make solutions more feasible & cost-effective.

So far, our projects have held a groundbreaking **Legal Workshop***, hearing from medicine, pharma, and bigtech across Europe, North America and Asia.

Whether you are a producer, consultant, academic or just interested, participate in our surveys and workshops to have a voice in detailing views and priorities that shape SbD.**

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Industry case applications for realism and adaptability

Case studies play an important role within all four NMBP-15 projects.

In total, **22 case studies** will **implement and evaluate developed tools and infrastructures** to facilitate the **safe(r) design of engineered nanomaterials**. The use cases progress up the TRL ladder, starting at TRL4 and achieving TRL6 at the end of the project.

All studies are performed with **industrial partners** from a range of relevant sectors: *paints & coatings, 3D printing, cosmetics* as well as *pharmaceutical and health technology*.

SMEs and large enterprises are actively engaged to identify benefits, shortcomings and limitations of the SbD approaches under realistic scenarios of use, to select cost-effective approaches, to test the user-friendliness of the support sequence, and to derive guidelines on integrating SbD into industry's innovation process.

Methodological approaches and output platforms/tools of the four projects

The NMBP-15 call is explicit about using existing resources: Making frameworks, models, tools and strategies available for YOU. We work together to improve access.

The **ASiNA** SbD management system offers a 5-step Roadmap: 1) **DEFINE**, imagine products and processes consistent with customer demands and the enterprise strategy; 2) **MEASURE**, testing strategy to measure quality and safety attributes; 3) **ANALYZE**, data curation and expert system to generate response functions and identify the best design solution; 4) **DESIGN**, testbeds to develop and optimize the design solutions; 5) **VERIFY**, pilot plants to implement and validate the best design solutions.

SABYNA supports safe innovation and manufacturing processes by small and medium enterprises. A **web-based platform** will integrate and streamline existing tools. **SMEs can input limited data to obtain tailored guidance** on identifying, assessing and mitigating risks to workers, consumers and the environment.

SbD4Nano develops a novel software "e-infrastructure" to foster dialogue and collaboration between actors along the nanotechnology supply chain for a knowledge-driven definition of Safe-by-Design approaches based on hazard, exposure, product performance and cost criteria.

SABYDOMA is developing two demonstrators at TRL6 as specific safety-by-design technologies. During the development process through the SABYDOMA case studies, the demonstration of these technologies within the other three projects' programmes will be encouraged.

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